

THE ROOT-LESION NEMATODE, *PRATYLENCHUS PENETRANS* AND OTHER NEMATODES  
ASSOCIATED WITH LEATHERLEAF FERN.

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Leatherleaf fern, *Rumohra adiantiformis* (Forst.) Ching is an important nursery crop in central Florida. Ferns are grown in shade, provided naturally by large oak, or other trees, or by plastic shade materials on wooden frames. The major fern production areas are in Lake, Putnam, and Volusia counties.

Several plant parasitic nematodes are associated with leatherleaf fern in central Florida where the greatest diversity in nematode species occurred in ferneries shaded by oak trees (3). *Pratylenchus penetrans* (Cobb, 1917) Filipjev & Schuurmans Stekhoven, 1941, *Tylenchorhynchus claytoni* Steiner, 1937, and *Criconebella* (= *Criconemoides*) *curvata* (Raski, 1952) Luc & Raski, 1981 were those most frequently found in ferneries (3). However, only *P. penetrans* (Fig. 1) has been consistently associated with inhibition of frond production (1,2,4,5). Rhoades (5) was the first to show pathogenicity of *P. penetrans* to leatherleaf fern.

Pathogenicity: *Pratylenchus penetrans* infects both roots and rhizomes, and it can easily invade surrounding plants, soil, or bed mixtures. Because leatherleaf fern is propagated vegetatively, nematode infestations can be spread to new sites by infected rhizomes. In a controlled experiment, Rhoades (5) reported that *P. penetrans*-inoculated rhizomes produced fewer and smaller leaves (Fig. 2). Frond production was greatly suppressed and nematodes increased in numbers.

Host suitability: Controlled studies (5,7) have shown that leatherleaf fern is a very good host for *P. penetrans*. Leatherleaf fern suitability to *P. penetrans* is reflected in greenhouse experiments showing *P. penetrans* populations increase on this host from 125 nematodes per pot to 325 per gram of root after two and one-half years (5). Kaplan and Osborne (3) reported a relative frequency and density of *P. penetrans* in 28 leatherleaf ferneries of 71% and 174 nematodes per gram root, respectively.

Survey: Bureau of Nematology files show that since 1956, 24 genera and 34 species of phytoparasitic nematodes were associated with soil and rhizome-root samples collected from leatherleaf fern in 59 ferneries. Seventeen genera and 28 species were found associated with this plant for the first time (Table 1). The diversity of the nematode species is due, in part, to ferneries being grown under oak trees or other shade trees whose roots will mix with those of fern. The nematode fauna of these trees may be different from those of leatherleaf fern.

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Table 1. Genera and species of phytoparasitic nematodes collected from soil, root, and rhizome samples taken from 59 leatherleaf ferneries in Florida.

Nematode	Frequency %*	Total	Nematode	Frequency %*	Total
<i>Pratylenchus</i> spp.	17.0		<i>X. americanum</i> **	0.4	
<i>P. penetrans</i> **	7.9		<i>X. chambersi</i>	0.4	3.5
<i>P. delattrei</i>	0.1		<i>Scutellonema</i> spp.	2.7	
<i>P. pratensis</i>	0.1		<i>S. bradys</i>	0.4	
<i>P. vulnus</i>	0.2	25.3	<i>S. brachyurus</i>	0.2	3.3
<i>Criconemella</i> spp.	9.1		<i>Meloidogyne</i> spp.	3.1	3.1
<i>C. annulata</i>	0.2		<i>Hemicriconemoides</i> spp.	1.7	
<i>C. curvata</i> **	0.4		<i>H. minutus</i>	0.9	
<i>C. macrodora</i>	1.0		<i>H. wessoni</i>	0.2	
<i>C. xenoplax</i>	0.3	11.0	<i>H. gaddi</i>	0.1	2.9
<i>Hoplolaimus</i> spp.	6.3		<i>Dolichodorus</i> spp.	1.6	
<i>H. tylenchiformis</i>	2.3		<i>D. heterocephalus</i>	0.9	2.5
<i>H. galeatus</i>	0.4	9.0	<i>Meloidodera</i> sp.	1.4	
<i>Hemicycliophora</i> spp.**	6.4		<i>M. floridensis</i>	0.8	2.2
<i>H. floridensis</i>	1.6		<i>Longidorus</i> spp.	1.5	1.5
<i>H. similis</i>	0.4		<i>Discocriconemella</i>		
<i>H. thienemanni</i>	0.1	8.5	<i>mauritiensis</i>	0.5	0.5
<i>Tylenchorhynchus</i> spp.	7.7		<i>Criconema</i> sp.	0.4	0.4
<i>T. claytoni</i> **	0.6		<i>Rotylenchus</i> sp.	0.3	
<i>T. nudus</i>	0.1	8.4	<i>R. minutus</i>	0.1	0.4
<i>Trichodorus</i> spp.	5.0		<i>Cacopaurus</i> sp.	0.3	0.3
<i>T. christiei</i>	0.2		<i>Heterodera</i> sp.	0.3	0.3
<i>T. proximus</i>	0.2		<i>Paratylenchus</i> sp.	0.3	0.3
<i>T. minor</i> **	0.2	5.6	<i>Tylenchus</i> sp.	0.2	0.2
<i>Belonolaimus</i> sp.	3.9		<i>Trophotylenchulus</i>		
<i>B. longicaudatus</i>	1.5	5.4	<i>floridensis</i> **	0.2	0.2
<i>Helicotylenchus</i> spp.	4.7		<i>Paralongidorus sacchari</i>	0.2	0.2
<i>H. dihystrera</i>	0.3	5.0			
<i>Xiphinema</i> spp.	2.2				
<i>X. brasiliense</i>	0.5				

\*Frequency of 24 genera and 34 species of phytoparasitic nematodes found in leatherleaf fern plantings collected since 1956.

\*\* Previously reported.

Control: Because of the wide distribution of *P. penetrans* in ferneries, precautions must be taken to prevent movement of this nematode to new sites. New plantings set out in new areas can be established free of *P. penetrans* only if nematode-free propagules are planted in soil which is free of the pest.

A summary of the efficacy of nematicides and leatherleaf fern yield has been published (6). The latest guide, Cut Foliage Research Note RH-88-B, titled "Pesticides labeled for use in commercial leatherleaf fern production in Florida - 1988" by R. H. Stamps, D. L. Colvin, R. A. Dunn, D. E. Short, & G. W. Simone, is available from the University of Florida, IFAS, Central Florida Research and Education Center, Apopka, Florida, 32703. This guide provides the most recent recommendations for control of nematodes in ferneries.

#### LITERATURE CITED:

1. Hamlen, R. A. 1978. Suppression of *Pratylenchus penetrans* in leatherleaf fern by nematicides. Plant Dis. Repr. 62:899-902.
2. Hart, W. H., and A. R. Maggenti. 1970. Granular and soil-spray nematicidal treatments for the control of root-lesion nematode, *Pratylenchus penetrans*, on leatherleaf fern. Plant Dis. Repr. 54:1016-1017.
3. Kaplan, D. T., and Lance S. Osborne. 1986. Plant parasitic nematodes associated with leatherleaf fern. J. Nematol. 18:26-30.
4. Overman, A. J. 1975. Control of *Pratylenchus penetrans*, endoparasitic nematode on leatherleaf fern. Proc. Fla. State Hort. Soc. 88:573-578.
5. Rhoades, H. L. 1968. Pathogenicity and control of *Pratylenchus penetrans* on leatherleaf fern. Plant Dis. Repr. 52:383-385.
6. Stamps, R. H. 1987. Plant parasitic nematodes, nematicides, and leatherleaf fern yield. University of Florida, IFAS Central Florida Research and Education Center, Apopka, CFREC-A Cut Foliage Research Note RH-87-A. 5 pp.
7. Stokes, D. E., and C. W. Laughlin. 1970. Control of *Pratylenchus penetrans* on leatherleaf fern transplants. Plant Dis. Repr. 54:287-288.

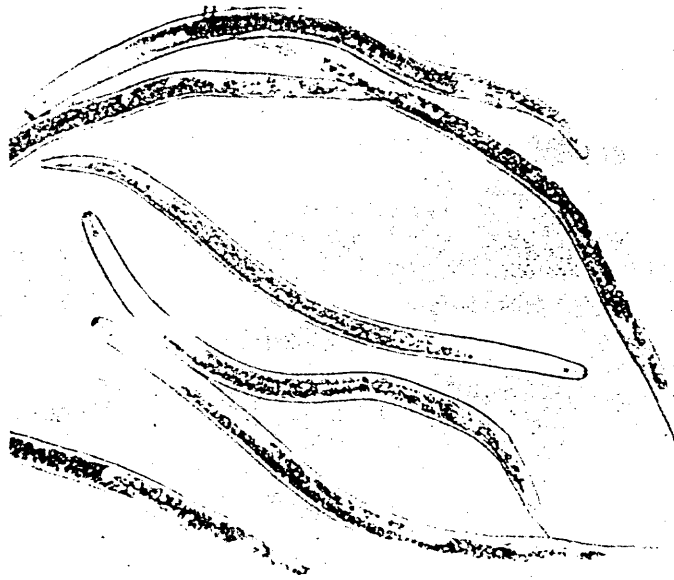


Fig. 1. The root-lesion nematode, *Pratylenchus penetrans*, a parasite of leatherleaf fern, *Rumohra adiantiformis*.



Fig. 2. Two leatherleaf fern, *Rumohra adiantiformis* plants of the same age. The plant on the left is not infected while the plant on the right is infected with the root-lesion nematode *Pratylenchus penetrans*. (Courtesy H. L. Rhoades).